

Having described the invention, the following is claimed:

1. An assembly comprising a housing, switch contacts at least partially disposed in said housing and operable between actuated and unactuated conditions, a switch actuation mechanism at least partially disposed in said housing, said switch actuation mechanism being operable between first and second conditions to effect operation of said switch contacts between the actuated and unactuated conditions, a cam follower at least partially disposed in said housing, a cam block having a cam surface with a first portion which is engaged by said cam follower when said switch contacts are in the unactuated condition and a second portion which is engaged by said cam follower when said switch contacts are in the actuated condition, a manually movable push button, a first force transmitting pin extending between said push button and said cam block to transmit force from said push button to said cam block, and a second force transmitting pin extending between said cam block and said switch actuation mechanism to transmit force from said cam block to said switch actuation mechanism, said cam block and said first and second force transmitting pins being integrally formed as one piece.

2. An assembly as set forth in claim 1 wherein said switch actuation mechanism includes a first actuator member, said first actuator member includes a first main section and first and second bearing sections having

cylindrical bearing surfaces extending from said first main section to support said first actuator member for pivotal movement relative to said housing about a first axis which is coincident with central axes of said first and second cylindrical bearing surfaces, said first main section and said first and second bearing sections being integrally formed as one piece, a second actuator member, said second actuator member includes a second main section and third and fourth bearing sections having cylindrical bearing surfaces extending from said second main section to support said second actuator member for pivotal movement relative to said housing about a second axis which is coincident with central axes of said third and fourth cylindrical bearing surfaces, said second main section and said third and fourth bearing sections being integrally formed as one piece, and a spring extending between said first and second actuator members, said spring being effective to press said first main section of said first actuator member against said second force transmitting pin, said spring being effective to apply force against said second actuator member to pivot said second actuator member about said second axis during pivotal movement of said first actuator member about said first axis.

3. An assembly as set forth in claim 2 wherein said switch actuation mechanism is a snap action mechanism which effects operation of said switch contacts between the actuated and unactuated conditions with a snap action,

said first actuator member being formed by a first piece of polymeric material, said second actuator member being formed by a second piece of polymeric material.

4. An assembly as set forth in claim 1 further including an annular groove in an end portion of said first force transmitting pin and a flange connected with said push button, said flange being disposed in engagement with said groove in said end portion of said first force transmitting pin to interconnect said push button and said first force transmitting pin.

5. An assembly as set forth in claim 1 further including a casing disposed within said housing, said casing including a support pin extending outward from a wall of said casing, said support pin being integrally formed as one piece with said wall of said casing, said cam follower includes a helical coil section which extends around said support pin, a follower arm which extends from said helical coil section into engagement with said cam surface, and a base arm which extends from said helical coil section and engages said casing.

6. An assembly as set forth in claim 5 wherein said follower arm has a main section and an end section which extends perpendicular to said main section of said follower arm and engages said cam surface, said base arm has a main section and an end section which engages said casing, said end

section of said follower arm and said end section of said base arm having central axes which extend parallel to a central axis of said support pin.

7. An assembly as set forth in claim 1 wherein said push button includes a plurality of solid state light sources which are electrically energizable to provide illumination, said assembly further includes a printed circuit connected with said switch contacts and said push button, and a plurality of electrical circuit components mounted on said printed circuit at a location between said push button and said switch contacts.

8. An assembly as set forth in claim 7 wherein said first force transmitting pin extends through an opening formed in said printed circuit at a location between said push button and said cam block.

9. An assembly as set forth in claim 7 wherein said printed circuit has a first major side surface which faces toward said housing and a second major side surface which faces away from said housing, at least a portion said electrical circuit components being disposed on said first major side surface of said printed circuit.

10. An assembly as set forth in claim 7 wherein said housing has a plurality of side walls disposed in a rectangular array, said printed circuit includes a main section and first and second arm sections, said main section of said printed circuit having a first end portion disposed adjacent to said switch contacts, a second end portion which is disposed adjacent to said push

button and an intermediate portion which extends between said first and second end portions and is disposed along a first side wall of said plurality of side walls of said housing, said first arm section of said printed circuit extends from said main section of said printed circuit and is disposed along second and third side walls of said plurality of side walls, said second arm section of said printed circuit extends from said main section of said printed circuit and is disposed along a fourth side wall of said plurality of side walls and is disposed along said third side wall of said plurality of side walls.

11. An assembly as set forth in claim 10 wherein a first portion of said electrical circuit components are mounted on said intermediate portion of said main section of said printed circuit, a second portion of said electrical circuit components are mounted on said first arm section of said printed circuit, and a third portion of said electrical circuit components are mounted on said second arm section of said printed circuit.

12. An assembly comprising a housing, switch contacts which are at least partially disposed in said housing and are operable between actuated and unactuated conditions, a switch actuation mechanism at least partially disposed in said housing, a manually actuatable push button, and a force transmitting apparatus extending between said push button and said switch actuation mechanism to transmit force from said push button to said switch actuation mechanism to effect operation of said switch actuation mechanism,

said force transmitting apparatus includes a first end portion which snaps into an opening connected with said push button to interconnect said push button and said force transmitting apparatus, said force transmitting apparatus includes a second end portion through which force from said push button is transmitted to said switch actuation mechanism.

13. An assembly as set forth in claim 12 further including a cam follower at least partially disposed in said housing, said force transmitting apparatus includes a cam block having a cam surface with a first portion which is engaged by said cam follower when said switch contacts are in the unactuated condition and a second portion which is engaged by said cam follower when said switch contacts are in the actuated condition, a first force transmitting pin which extends between said push button and said cam block, said first end portion of said force transmitting apparatus being disposed on said first force transmitting pin, and a second force transmitting pin extending between said cam block and said snap action mechanism, said second end portion of said force transmitting apparatus being disposed on said second force transmitting pin, said cam block and first and second force transmitting pins being integrally formed as one piece.

14. An apparatus as set forth in claim 12 wherein said opening in said push button is at least partially defined by a plurality of resiliently deflectable flanges, said first end portion of said force transmitting apparatus includes an

annular groove and an end surface area, said end surface area being engagable with said resiliently deflectable flanges to increase the size of the opening connected with said push button to enable said annular groove to move into the opening connected with said push button, said flanges being engagable with said annular groove to interconnect said push button and said force transmitting apparatus.

15. An assembly as set forth in claim 12 wherein said switch actuation mechanism includes a first actuator member, said first actuator member includes a first main section and first and second bearing sections having cylindrical bearing surfaces extending from said first main section to support said first actuator member for pivotal movement relative to said housing about a first axis which is coincident with central axes of said first and second cylindrical bearing surfaces, said first main section and said first and second bearing sections being integrally formed as one piece, a second actuator member, said second actuator member includes a second main section and third and fourth bearing sections having cylindrical bearing surfaces extending from said second main sections to support said second actuator member for pivotal movement relative to said housing about a second axis which is coincident with central axes of said third and fourth cylindrical bearing surfaces, said second main section and said third and fourth bearing sections being integrally formed as one piece, and a spring

extending between said first and second actuator members, said spring being effective to press said first main section of said first actuator member against said second end portion of said force transmitting apparatus, said spring being effective to apply force against said second main section of said second actuator member to pivot said second actuator member about said second axis during pivotal movement of said first actuator member about said first axis.

16. An assembly as set forth in claim 12 wherein said push button includes a plurality of solid state light sources which are electrically energizable to provide illumination, said assembly further includes a printed circuit connected with said switch contacts and said push button, and a plurality of electrical circuit components mounted on said printed circuit at a location between said push button and said switch contacts.

17. An assembly as set forth in claim 16 wherein said first end portion of said force transmitting apparatus extends through an opening formed in said printed circuit.

18. An assembly as set forth in claim 12 wherein said switch actuation mechanism is of the snap action type and is operable to quickly move said switch contacts from the unactuated condition to the actuated condition in response manual actuation of said push button.



19. An assembly comprising a housing, switch contacts which are at least partially disposed in said housing and are operable between actuated and unactuated conditions, a snap action mechanism at least partially disposed in said housing, said snap action mechanism being operable between first and second conditions to effect operation of said switch contacts between the actuated and unactuated conditions, a manually actuatable push button, and a force transmitting apparatus extending between said push button and said snap action mechanism to transmit force from said push button to said snap action mechanism to effect operation of said snap action mechanism, said snap action mechanism includes a first actuator member, said first actuator member includes a first main section and first and second bearing sections having bearing surfaces extending from said first main section to support said first actuator member for pivotal movement relative to said housing about a first axis which is coincident with central axes of said first and second bearing surfaces, said first main section and said first and second bearing sections being integrally formed as one piece, a second actuator member, said second actuator member includes a second main section and third and fourth bearing sections having bearing surfaces extending from said second main section to support said second actuator member for pivotal movement relative to said housing about a second axis which is coincident with central axes of said third and fourth bearing surfaces,

said second main section and said third and fourth bearing sections being integrally formed as one piece, and a spring extending between said first and second actuator members, said spring being effective to press said first main section of said first actuator member against said force transmitting apparatus, said spring being effective to apply force against said second actuator member to pivot said second actuator member about said second axis during pivotal movement of said first actuator member about said first axis.

20. An assembly as set forth in claim 19 wherein said force transmitting apparatus includes a first end portion which snaps into an opening connected with said push button to interconnect said push button and said force transmitting apparatus.

21. An apparatus as set forth in claim 19 wherein said force transmitting apparatus is integrally formed as one piece which is connected with said push button and which engages said first main section of said first actuator member.

22. An assembly as set forth in claim 19 further including a cam follower, said force transmitting apparatus includes a cam block having a cam surface which is engagable by said cam follower to retain said switch contacts in the actuated condition, a first force transmitting pin extending between said push button and said cam block to transmit force from said push button

to said cam block, and a second force transmitting pin extending between said cam block and said snap action mechanism to transmit force from said cam block to said snap action mechanism, said cam block and said first and second force transmitting pins being integrally formed as one piece.

23. An assembly comprising a housing, a display apparatus which is at least partially enclosed by said housing, said display apparatus includes a plurality of solid state light sources, a block disposed in said housing, and a pin extending between said display apparatus and said block, said pin having an end portion which snaps into an opening connected with said display apparatus to interconnect said block and said display apparatus.

24. An assembly as set forth in claim 23 further including a plurality of terminals extending from said housing, a printed circuit having a first end portion connected with said terminals and a second end portion connected with said display, said printed circuit having an intermediate portion which extends from said first end portion to said second end portion of said printed circuit, a first portion of said intermediate portion of said printed circuit being disposed between said housing and said block, a second portion of said intermediate portion of said printed circuit being disposed between said block and said display, said second portion of said intermediate portion of said printed circuit includes an opening through which said pin extends.

25. An assembly comprising a housing, switch contacts at least partially disposed in said housing and operable between actuated and unactuated conditions, a snap action mechanism at least partially disposed in said housing, said snap action mechanism being operable between first and second conditions to effect operation of said switch contacts between the actuated and unactuated conditions, a cam follower at least partially disposed in said housing, a manually actuatable push button, and a force transmitting apparatus extending between said push button and said snap action mechanism to transmit force from said push button to said snap action mechanism, said force transmitting apparatus includes a first end portion which snaps into an opening connected with said push button to interconnect said push button and said force transmitting apparatus, said force transmitting apparatus includes a second end portion through which force is transmitted to said snap action mechanism, said force transmitting apparatus includes a cam block which is integrally formed as one piece with said first and second end portions of said force transmitting apparatus, said cam block having a cam surface which is engagable by said cam follower to retain said switch contacts in the actuated condition, said snap action mechanism includes a first actuator member, said first actuator member includes a first main section and first and second bearing sections which support said first actuator member for pivotal movement, said first main section and said first

and second bearing sections being integrally formed as one piece, a second actuator member, said second actuator member includes a second main section and third and fourth bearing sections which support said second actuator member for pivotal movement, said second main section and said third and fourth bearing sections being integrally formed as one piece, and a spring extending between said first and second actuator members.

26. An apparatus as set forth in claim 25 further including a printed circuit having a first end portion connected with said switch contacts and a second end portion connected with said push button, said printed circuit having an intermediate portion which includes an opening through which said force transmitting apparatus extends.